certain of these hair-marks. According to native ideas, the old maxim that "a good horse cannot be a bad colour" does not hold good, white, dun, grey, piebald and skewbald animals being much more highly esteemed than those of other colours. A white bullock, again, is held to be of little value, while a black one is regarded as vicious.

SEVERAL popular scientific articles appear in the February number of *Pearson's Magazine*. Mr. R. S. Baker gives a description of some of Sir John Murray's work in oceanography, this being the first of a series on the science of the sea. Mr. Alder Anderson describes Russian Imperial forestry; Mr. T. E. James writes about the remarkable Crater Lake, Oregon; and Mr. T. Morton corrects some mistakes about rainbows in pictures, illustrating his contribution with several good photographs of rainbows. In *Good Words*, Miss G. Bacon describes the Yerkes Observatory; and there are also articles on an ascent of Mount Rainier- the highest mountain in the United States outside Alaska—the effect of light of various wave-lengths upon the growth of plants, the Purbeck marbles, and Miss Mary Kingsley.

IN an address recently delivered to the Chemical Society of the Goldsmiths' Institute, Dr. Julius Lewkowitsch dealt with "The Profession of an Industrial Chemist." The views of Dr. Lewkowitsch, who has had a long experience of manufacturing chemistry both in Germany and in this country, are entitled to very careful attention. He is able to recall the days when in Germany the chemical manufacturer was chiefly a merchant who thought he was marching with the times when he took into his works a young man to act as a testing machine and to become, later on, when he had shaken off the last remnants of chemical knowledge, assistant works manager. Dr. Lewkowitsch points out how entirely this condition of things, which is still prevalent in England, has changed in Germany. His main contention is that that the training which is most effective is that which is most liberal and educationally thorough. He has no grudge against the classics; on the contrary he extols their educational value when properly taught, and he is more solicitous that the school teaching of science should develop the logical faculty than that it should impart a fund of specialised knowledge. In the University period he would have a broad, thorough and unbiased study of chemistry and allied sciences ending, where possible, with some training in the special methods of technological laboratories. He concludes with a very graphic and complete account of the circumstances with which the chemist, so far trained, will have to contend in the works and the conditions necessary for his becoming the scientific master of his surroundings. Dr. Lewkowitsch's address combines high educational ideals with keen appreciation of practical requirements, and it deserves a wide circulation among those who are concerned directly or indirectly with chemical industries.

THE additions to the Zoological Society's Gardens during the past week include a Red-faced Ouakari (*Ouacaria rubicunda*) from the Upper Amazons, presented by Mr. Alfred Hutchinson; a Long-eared Bat (*Plecotus auritus*), a Common Bat (*Vesperugo pipistrellus*), British, presented by Mr. Louis Grundel; a Feline Dourocouli (*Nyctipithecus vociferans*) from South Brazil, a Yellowish Capuchin (*Cebus flavescens*) from South America, two Sharp-tailed Conures (*Conurus acuticauda*) from Paraguay, a Common Waxbill (*Estrelda cinerea*) from West Africa, seventeen Blue-tongued Lizards (*Tiliqua scincoides*) from Australia, deposited; a Sœmmerring's Pheasant (*Phasianus soemmerringi*) from Japan, an Elliot's Pheasant (*Phasianus ellioti*), two Amherst Pheasants (*Thaumalea amherstiae*) from China, a Black-backed Kaleege (*Euplocamus melanotus*) from Sikkim, purchased.

OUR ASTRONOMICAL COLUMN.

VARIABILITY OF EROS.—A circular from the Centralstelle at Kiel calls attention to an important notice from Dr. E. von Oppolzer respecting the planet Eros. He says that Eros shows a variation of brightness of about one magnitude, the change taking place in a few fours. It is in the highest degree desirable that, so far as possible, numerous estimations with neighbouring stars should be made in the course of each night.

CATALOGUE OF PRINCIPAL STARS IN COMA BERENICES CLUSTER.—The sixteenth issue of *Contributions from the Observatory of Columbia University*, New York, contains the discussion and reductions by Mr. W. C. Kretz of a series of measures of this cluster, from photographs obtained by Dr. Rutherford with his 13-inch refractor during 1870-76. The eleven standard stars adopted were reduced from the records of thirty-five catalogues, extending from that of Bradley in 1755 to the Greenwich results, 1887-94. The method of reduction is given in detail with tables of data for determining final positions, concluding with a list of twenty-four stars showing corrected coordinates and proper motions.

UNITED STATES NAVAL OBSERVATORY.—The report of the superintendent of the Naval Observatory at Washington deals with the progress of work during the fiscal year ending June 30, 1900. All the instruments have been in use on every clear night and day.

The 26-inch equatorial has been devoted to observations of difficult double stars, satellites of planets, and a long series of investigations on the use of ocular colour screens for planetary and double star measurements. The double floor, mentioned in a previous report, has undoubtedly improved the working conditions in partly eliminating the variable air currents in the dome. Certain markings have been observed on the disc of Neptune indicating a similarity to the belts of Jupiter.

Photographs of the sun have been taken with the photoheliograph of 40-feet focal length on every fine day, except in April and May, when it was dismounted for use during the total eclipse of the sun. For this eclipse an extensive programme, including spectroscopic, polariscopic and other items, was successfully carried out, the report of which will be ready shortly.

DOUBLE STAR MEASURES.—In the *Astronomische Nachrichten* (Bd. 154, Nos. 3680-1), Dr. Doberck gives a long series of measures of double stars obtained with the 14-inch refractor of the University Observatory, Copenhagen. Comparisons are discussed between the performance of short and long focus instruments with respect to the measurement of close doubles.

SCIENCE AT SHEFFIELD UNIVERSITY COLLEGE.

TWO addresses delivered at the University College of Sheffield on Thursday last, the occasion being the annual distribution of medals, prizes and certificates to successful students of the Technical Department, should be of service to science and technical education in the city. One was by Dr. H. C. Sorby, F.R.S., who during the greater part of the past fifty years has been occupied with scientific research. His remarks on the practical value of scientific theory admit of wide application, and the following report from the *Sheffield and Rotherham Independent* will be read with interest. A valuable address on technical and scientific education was also given by Alderman W. E. Clegg, who in the course of his remarks indicated three directions in which future efforts should be devoted in order to maintain our position in the industrial world; they are:—

(1) Greater energy and enterprise on the part of our manufacturers in utilising to the utmost existing markets, finding fresh ones, seizing every opportunity which presents itself to develop our increasing output and a greater adaptability and suitability of our goods to the requirements of our customers. (2) A closer union and real sympathy between employers and employed, each realising that the interests of the one are bound up in the interests of the other. (3) Greater interest and appreciation of the advantages of a technical and scientific education, and in connection with this all possible facilities should be given to men and boys to enable them to learn the science—the why and wherefore of the particular work they are engaged in—so that they can take an intelligent interest in what they are doing and what they have to do.

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Dr. Sorby spoke as follows :—

What he proposed that evening was to say something with regard to the interdependence of the different branches of knowledge. He would speak only of physical science, and he would confine his remarks to what bore directly on the Technical School. He was very sorry to say that as things were at present many looked upon the University College as quite a distinct thing from the Technical School. Unfortunately there were two buildings, and he thought that had something to do with the idea. But he did hope that before long there would not be two buildings. He hoped they would succeed in erecting a University College that would include all the branches, and he would very much like to see written over the door : "Scientia una et indivisa."

He took it that he might assume that knowledge such as they were trying to teach in the University College might be divided into two divisions—what they might be pleased to call science, theoretical and practical. Now he maintained that the division between theory and practice was perfectly evanescent. It might be convenient to divide them, as it was convenient to divide yesterday and to-morrow ; but when to-morrow came, to-morrow would not be to-morrow. It was the same with theory and practice in science. What was looked upon to-day as abstract theory, and of no practical use, would probably be to-morrow the foundation of some most important practical question which would revolutionise the whole world. He could not call it a feud, but the division of these two branches—theory and practice—was now non-existent. He was afraid that a good many people looked upon some branches of the subjects which were studied in the college as of not very much use, simply because they did not enable them to make puddings or construct anything else. He maintained that that was a very false view of the matter. Now, he had often heard in years gone by that theory was no good ! What was wanted was good practical knowledge. In illustrating that idea, he would refer to a matter he recollected when we were carrying on the war in the Crimea. It was said that when the Russians built Sebastopol they furnished the labourers with wheelbarrows. The men had never seen a wheelbarrow before, and they filled them with earth and carried them on their backs. They could very well imagine some accomplished Russian officers pointing out the advantage of the wheelbarrow, and telling them how much labour might be saved by pushing the barrows instead of carrying them. Some of those labourers might have replied that they did not care a bit for what the officer said ; what they really wanted was a good practical knowledge of how to carry the wheelbarrow on their backs. It was not so many years ago that one heard similar remarks to this in reference to a great many other subjects than wheelbarrows. He thought he might even say that in some cases pure theory was much more practical than practice.

There were cases where they could obtain a result with ease and accuracy by calculation, and if they attempted to do it by practice they would not do it so easily, and they would not do it with anything like accuracy. In such a case he held that theory, after all, was the much more practical of the two. He had been talking to Dr. Hicks about a subject for a lecture which he hoped to give from that desk in time to come, and he suggested as the title of that lecture, "The value of knowledge thought to be useless." There were no end of interesting illustrations to be found, and he was sure it would be a very good subject for a popular lecture. He could not help slightly trenching on that lecture because it had a lot to do with what he was trying to point out that evening. Some 2500 or 3000 years ago it was found that if you rubbed amber on cloth or anything of a similar nature it would attract little bits of paper. The Greek word for amber was "Electron." What would anybody have thought in those days if any one had said that if you only studied that peculiarity a little more you would be able to have tramcars with halfpenny fares ? He need not describe what would have been the opinion of people in those days on that subject. Then again, the lodestone was called by a word which ultimately led to the word "magnetism." It was known that lodestone would attract bits of iron, and he believed it was Pliny who said that it had "such a great love for iron that it pulled pieces of iron to it." No doubt that idea and very little more than that notion existed for something like 1500 years. Then somebody found out that you could magnetise a needle, and that it would point to the north, and shipping was entirely revolutionised. Then again, Galvani, fortunately, was taken ill, and it was thought it would be a very good thing for him to have some frogs for dinner. When the cook placed the frogs' legs on the pewter plate on which they were served she noticed that they began to kick. She thought this very curious and drew Galvani's attention to it. The result was the discovery of Galvanism. These things were known for a very long time. He remembered the time before the principle of electro-plating was discovered. He recalled the man who discovered how to electro-plate with silver. They used to entertain themselves with making galvanic batteries and trying experiments. He remembered very well that his friend said, "Well, now, Sorby, I don't see any reason why we should not study these things, although people say that electricity is a thing that can never be of any use to anybody." What would anybody say if that remark were made to-day ?

About thirty-six years ago he pointed out how very important was the investigation of the microscopical study of iron and steel. He read a paper at the British Association meeting at Bath, and his specimens were exhibited before the Royal Society. They were very much admired, and thought very pretty, but for twenty-three years nobody did anything ; nobody took the slightest interest in the subject. Eventually the Iron and Steel Institute asked him to read a paper on the subject. He did so, and the result was that the study of the microscopic structure of iron and steel was now thought of great importance. One felt very pleased to think that things had moved so, because this microscopic investigation, which was so long dormant, was now employed in almost every civilised country, and he was very proud to think that the Sheffield Technical School was at the front so far as this subject was concerned. Prof. Arnold, whom he very greatly regretted was ill, was selected by the Admiralty to make an investigation into the structure of the steel shaft which failed on one of H.M.'s torpedo boats. Prof. Andrews was also an authority on the structure of steel rails, and he was often consulted in connection with railway accidents. He did not want to occupy too much time, but what he did wish to impress on his audience was this, that judging by the experience of years gone by there was nothing that you could discover that might not turn out to be of the greatest possible value. You could not say that it would, but you could not say that it would not. As an example, some few years ago a friend of his was examining under the microscope with a very high power the blood discs in the blood of frogs, and he discovered in these blood discs certain curious little things which were found to be very minute parasitic animals. If they had mentioned this to the man in the street he would have thought that it was a most absurd idea to pay much attention to a thing like that. But a further study of that subject had led to the knowledge of the real cause of a disease which in India killed annually about as many people as the whole of the population of England, and not only had they learned the cause of the disease, but there was every probability that they would succeed in putting a stop to it. The magnitude of the result was almost incomputable.

He could liken them all to a small colony on a big continent. They made a few roads and settled down. But if they were content with these few roads and never troubled themselves about the backland, how would they progress ? Some other country would take the backland. What they wanted was to explore the unknown ; to march to the top of some mountain and look down on the country never seen before by civilised eyes. They would then find valuable gold mines, coal, and all manner of things. If they were content with what they knew they would make no progress. They might hold their own, but he did not know whether they would do that. They should try to learn fresh things. His friend, Alderman Clegg, was about to distribute the prizes, which were all very well in their way, but he should like to see them win prizes for original research, to make discoveries and invent new industries, and conquer the trade of the world. They ought to develop the manufactures in this city in such a way that they might beat the Germans and the Americans, so that they might capture the trade of the whole world in their particular department. This electric railway in London—the only thing that was English about it was the tunnel. The only thing about that railway that was made in England was the tunnel. Everything else was American. It has even been said that it was surprising that the tunnel had not been sent to America to be made. But they did not want that sort of thing to go on, and in order to prevent it they must have no rivalry between theory and practice in science. He hoped they would be able on another occasion to meet in a building worthy of the town, and where all these different subjects would be correlated and united in one.

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